

ABSTRACT OF THE INVENTION

The instant invention provides in-vivo methods and apparatus for radiation dosimetry assessment in individuals exposed to potentially harmful radiation, based on measurements in-situ of the teeth. The *in vivo* dosimetry assessment methods and apparatus utilize electron paramagnetic resonance (EPR) techniques; and employ an apparatus comprising an integrated EPR spectrometer system, an ergonomic magnet and a constructed resonator structure. In various aspects, the dosimetry assessment apparatus is configured to be easily portable and withstand potentially adverse mechanical effects of transportation and deployment in the field. The apparatus also is configured with a power supply that is compatible with both conventional AC line voltages and/ or other sources of power suitable for field conditions; and may be easily operated by minimally trained technicians to quickly generate a readout of estimated radiation exposure dose.